DOCUMENT-IDENTIFIER: US 5974666 A
TITLE: Process for preparing a charging device

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BSPR:
Examples of the silicon type compound include **silicon oxide** (silica), silicon
nitride, carborundum, organic group-substituted or nonsubstituted **silicon oxide**
type/silicon nitride type ceramics, etc. Examples of the organic group include:
hydrocarbon residual groups such as methyl group, ethyl group, n-propyl group,
i-propyl group, n-butyl group, i-butyl group, t-butyl group, hexyl group,
stearyl group, cyclohexyl group, phenyl group, tolyl group, benzyl group, etc.

BSPR:
When **perhydropolysilazane** is heated under an air or oxygen gas atmosphere,
silicon oxide type ceramics are produced in the aforementioned thermal
decomposing reaction. When **perhydropolysilazane** is heated under a nitrogen gas
atmosphere, silicon nitride type ceramics are produced in the aforementioned
thermal decomposing reaction. When
organic-group-substituted polysilazane is
used, silicon type ceramics denatured by the organic group are produced so that
the hardness of the charging device and the hardness of the protective layer
can be reduced. Polysilazane in which the percentage of substitution of the
organic group is not larger than 30% is used generally, but the present
invention is not limited thereto.

DEPR:
Then, a roll having a resistance regulation layer 1d formed thereon was
immersed in a 20% xylene solution of **perhydropolysilazane** (Tonen Polysilazane;

made Tonen Corp.) having a weight-averaged molecular weight of 4000 to 5000, and then burned at 150.degree. C. to thereby form a protective layer 1e formed from an amorphous silica film and having a film thickness of 1 .mu.m. The hardness of the charging device 1 thus produced was 51.degree., and the pencil hardness of the amorphous silica film was 9H.

DEPR:
The, the roll having the resistance regulation layer 1d formed was immersed in a 20% xylene solution of **perhydropolysilazane**. Then, the roll was burned in a nitrogen current at 150.degree. C. to thereby form a protective layer 1e formed from an amorphous silicon nitride film and having a film thickness of 0.5 .mu.m. The hardness of the charging device 1 thus produced was 55.degree., and the pencil hardness of the amorphous silicon nitride film was 9H.

DEPR:
The, the roll having the resistance regulation layer 1d formed on the electrode layer 1c in the same manner as Embodiment 1, was immersed in a 20% Xylene solution of 10%-methylated **perhydropolysilazane** (Tonen polysilazane: made by Tonen Inc.). Then, the roll was burned at 150.degree. C. to thereby form a protective layer 1e formed from a methyl group-denatured amorphous silica film and having a film thickness of 1 .mu.m. The hardness of the charging device 1 thus produced was 45.degree., and the pencil hardness of the methyl group-denatured amorphous silica film was 6H.

DEPR:
The roll of Embodiment 1 having the resistance regulation layer 1d formed was immersed in a 20% xylene solution of 10%-phenylated **perhydropolysilazane** (Tonen polysilazane: made by Toner Inc.). Then, the roll was burned at 150.degree.

C. to thereby form a protective layer 1e formed from a phenyl group-denatured amorphous silica film and having a film thickness of 2 .mu.m. The hardness of the charging device 1 thus produced was 45.degree., and the pencil hardness of the amorphous silica film was 6H.